AVICULTURAL MAGAZINE

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Grey-backed White-Eye.

AVICULTURAL MAGAZINE

THE JOURNAL OF THE AVICULTURAL SOCIETY
AND THE AVICULTURAL SOCIETY OF AMERICA

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THE WHITE-EYE IN NEW ZEALAND

By ALAN R. LONGHURST (Freetown, Sierra Leone, West Africa)

New Zealand lies across a belt of strong, prevailing westerly winds and a proportion of its terrestrial bird fauna has clearly been derived in relatively recent times from Australia, about 2,000 miles upwind across the Tasman Sea. Some species, such as the native pipit and the Purple Gallinule, or Pukeko, have probably been established for a very long period, but others such as the Spur-winged Plover and Spoonbill have only managed to establish themselves in historical times, perhaps because of the effect on the environment of the settlers. The White-Eye (*Zosterops lateralis*) belongs to this group and is of as recent origin in the fauna as many of the passerines that were introduced by the early settlers ; in this case it is fairly certain that the trans-Tasman migration was performed unaided for the initial irruptions were in too great numbers to be accounted for by casual ship-borne immigrants, nor is there apparently much evidence to show that the invasion would have been less successful in an unsettled New Zealand, for the species is now to be found as commonly in dense forest as in, say, cultivated gardens.

The arrival of immigrants from the normal range of the species in South-east Australia and Tasmania and their subsequent spread in New Zealand has been relatively well documented ; the first major irruption was probably in 1856 when large numbers appeared on the west coast of the North Island, subsequently spreading very rapidly. After a period of irregular inter-island migration and irregular breeding the species settled down to its present habits and abundance. White-Eyes are now perhaps the most abundant passerines in many parts of New Zealand and during winter a flock may readily be induced to remain in the garden by the use of feeding dishes of sugar-syrup or diluted honey—at which they may be joined by Bellbirds (*Anthornis*) or Tuis (*Prosthemadera*) if there is any native forest nearby.

The diet is largely derived from the nectar of the many flowering trees and shrubs that occur in New Zealand, from small soft berries and from small insects. The illustration shows White-Eyes on *Coprosma*, a very abundant bearer of berries and a favourite resort of native birds during the winter months. White-Eyes are intensely active and are often hard-pressed for food during the short period of cold weather ; in common with other passerines which form winter foraging flocks the birds are very quarrelsome at food and are constantly going into threat display over a feeding dish. Two birds—for no reason that is clear to the watcher—suddenly stare intently at each other with open beaks and quivering wings and if the display becomes more intense fly together and spiral upwards in the manner of fighting Starlings. Without the use of colour rings, it is not easy to study the social hierarchy of the flocks, but it is clear that there are dominant and subordinate individuals due, perhaps, to differences in size and aggressiveness ; however, the social structure is not very rigid and it is not unusual to see a displaying couple return to the dish and feed apparently amicably side by side. Clearly an interesting field awaits a New Zealand ornithologist.

* * *

THE GOLDEN-SHOULDERED PARRAKEET

(*Psephotus chrysopterygius* Gould)

By Alan Lendon (North Adelaide, S. Australia)

The recent acquisition of a pair of this little-known species, thanks to the generosity of Sir Edward Hallstrom, has prompted the writing of this article.

Discovery

As recorded by A. H. Chisholm in *An Explorer and His Birds*, John Gilbert discovered the Beautiful, or Paradise, Parrakeet (*Ps. pulcherrimus*) on the Darling Downs in 1844 and, in the course of the Leichhardt Expedition, he noted this species as far north as Comet Creek, approximately on the Tropic of Capricorn. It was not until about six months later (17th June, 1845), when the expedition had reached the Mitchell River, that Gilbert wrote " I was surprised to-day to meet with my new Platycercus of the Downs, a species which has not been observed with us since leaving Deception Camp on Comet Creek ". Three days later he recorded the bird as being common and on 24th June, only four days before his death—and while the party was still in the region of the Mitchell—he wrote " The new Platycercus I saw in great numbers ".

It is my belief that the birds he saw in the vicinity of the Mitchell

River were not his " Platycercus of the Downs " but that, in fact, he had discovered its nearest relative, the Golden-shouldered Parrakeet. I have discussed this several times with Chisholm, but he believes that " Gilbert was so good an ornithologist that it seems extremely improbable that he would mistake another species for his ' new green parrot ' or that he would fail to recognise the Golden-shouldered as new if he saw it ". Nevertheless, when the Golden-shouldered was first imported into England, immature specimens were mistaken by experienced aviculturists for the Paradise Parrakeet, with which they were very familiar.

Be the foregoing as it may, it is, according to Cayley, just over 100 years since the species was described and named by Gould in 1858 from specimens obtained by Elsey in the Normanton district in 1856, less than 200 miles to the south-west of the Mitchell River.

Introduction to Aviculture

Nothing further was heard of the species until some forty years later when six living specimens were received in England in 1897 from the Continent, being at first thought to be immature Paradise Parrakeets. Two of these, including the only male, were acquired by the Zoological Gardens at Regent's Park, two by C. T. Maxwell, and the remaining two by Reginald Phillipps, who wrote an interesting article about them in Avicultural Magazine, July, 1898, p. 154, accompanied by a reasonably good coloured plate by P. J. Smit. A further two specimens, again both hens, are said to have come to England in the following year but their destination does not appear to be recorded. It seems probable that the whole of the original consignment did not reach England as a pair of hybrids between the Golden-shouldered and Many-coloured Parrakeet, " presumably bred in some continental aviary ", were received in 1901 by the London Zoological Society and exhibited in their collection. As Cayley comments, the locality from whence this importation came is unrecorded, but it is of interest to note that examples of another far-northern Queensland species, the White-eared Grassfinch (*Poephila leucotis*) were obtained by Reginald Phillipps at about the same time, being the subject of an article by him in the next (August, 1898) number of Avicultural Magazine, also accompanied by a coloured plate by Smit.

The following year Phillipps (Avicultural Magazine, August, 1899, p. 157) describes the laying of eggs by his surviving hen mated to a cock Red-rumped Parrakeet and it is further noted that this hen was still alive in November, 1902. In addition, C. T. Maxwell exhibited two hens at the 1898 Crystal Palace Show and one the following year and in February, 1901, and at the following show, L. W. Hawkins exhibited a hen, possibly the same bird.

The Hooded Confusion

In Avicultural Magazine, November, 1902, p. 30, Mrs. M. A. Johnstone writes, claiming to have obtained a pair of the species and asking for and obtaining from Phillipps much information regarding their management. Then in Avicultural Magazine, July, 1903, p. 300, D. Seth-Smith describes seeing a pair, comprising one of the hens from the original importation and a new cock bird, in the course of a visit to the parrakeet collection of W. R. Fasey. As Seth-Smith later points out (Avicultural Magazine, April, 1910, p. 197, and May, 1910, pp. 223–4), it seems almost certain that Mrs. Johnstone's pair and Fasey's cock bird (which may well have been obtained from Mrs. Johnstone) were in fact Hooded Parrakeets (*Ps. dissimilis*) and probably constituted the first importation of the species, which had only been described as recently as 1898, into England. It is worthy of note that, as Cayley points out, the Bauer drawing, to which Gould refers and which was made some forty years before the discovery of the Golden-shouldered, was in fact a painting of the Hooded !

Rediscovery

Thereafter, it was not until April, 1915, that McLennan collected a specimen on the Watson River, North Queensland and then, in 1922, the same collector obtained and hand-reared some young birds ; ten of which were presented to Taronga Park Zoo in June of that year and lived there for several years without ever breeding.

Ken Stott, junior, writing in Avicultural Magazine, March–April, 1951, p. 68, lists the Golden-shouldered Parrakeet amongst " choice items " that the Zoological Garden of San Diego have exhibited. In reply to a query from me, Stott (*in litt.* 23rd December, 1952) states that the birds in question were obtained by an agent in Australia in 1925 and he feels certain that they were not mistakenly-identified Hoodeds ; it seemed possible that Taronga Park may have been the source of supply as other stock was obtained from there by San Diego at the same time and this has subsequently been confirmed.

Then Dr. Donald Thomson in *Birds of Cape York Peninsula*, published in 1935, describes his experiences of the species in the field, based on three expeditions to North Queensland between the years 1928 and 1933.

Establishment in Captivity

After an interval of about twenty years, one comes to what might well be described as the Hallstrom era, or the recent history of the species. Towards the end of 1953, shortly after I had visited him on my way to England, Sir Edward obtained two adult hand-reared males from the Coen district, Cape York Peninsula, and succeeded in 1954 in breeding hybrids from one of these birds, mated to a Hooded

hen. On my next visit to Sydney, which was not until March, 1955, I saw the species in life for the first time and, as I recorded in AVICULTURAL MAGAZINE, July–August, 1955, p. 214, there were then, in addition to the two adult males, eight young birds which had resulted from a second expedition sent to the Cape York area. On a subsequent visit in August of the same year, there were about twenty of the species in the collection, including further young resulting from a third trip to their habitat.

In AVICULTURAL MAGAZINE, May–June, 1956, p. 118, Sir Edward records having seventeen birds, including four mated pairs and mentions hybrids bred from the two original males with Hooded mates.

In October, 1956, I was again privileged to see the collection and at that time was shown a nest containing five half-grown, pure-bred young as I recorded in AVICULTURAL MAGAZINE, January–February, 1957, p. 35. Obviously, these were the first of many later successful breedings for, in AVICULTURAL MAGAZINE, November–December, 1957, p. 197, Sir Edward stated that he then had fifteen pairs, plus a few odd cocks, and he also mentioned that birds only a year old had nested and reared young. Writing again in AVICULTURAL MAGAZINE, May–June, 1959, p. 79, Hallstrom stated that his flock had grown to about forty birds and when I visited him in August, 1959, there seemed to be about this number and he was generous enough to present me with a pair which had been bred during the winter of 1958, i.e. in the first of the customary two nests. The cock of this pair was at that stage about one-third coloured and now at the time of writing (December, 1959), he has attained full adult plumage and is in perfect condition, as is his mate.

DESCRIPTION

As most parrot lovers know, a Many-coloured Parrakeet is appreciably slimmer than a Red-rumped and similarly, a Hooded Parrakeet is noticeably slimmer than a Many-coloured. Therefore, to describe a Golden-shouldered as appreciably slimmer than a Hooded and noticeably smaller should convey the impression of the extremely stream-lined and graceful appearance of the species which differs from the Hooded in other respects far more in life than is expected from a study of skins or illustrations.

The cock bird differs, therefore, from the Hooded in the following features, viz. (*a*) the presence of a broad, creamy-yellow frontal band, which is sometimes tinged with green ; (*b*) a triangular black cap entirely above the eyes and consequently not as extensive as that of the Hooded ; (*c*) the mantle is slaty-grey rather than brownish-black as in the Hooded ; (*d*) the shoulder patch is only about half the extent of that of the Hooded and is more truly golden-yellow ; (*e*) the breast is noticeably turquoise-blue as opposed to turquoise-green in the

Hooded ; and (*f*) the abdomen and subcaudals are pinkish-red with white margins to the feathers unlike the salmon subcaudals and occasional thigh feathers of the Hooded.

The hen bird resembles the Hooded hen more closely than does her mate, but differs in the following important respects, viz. (*a*) the presence of a definite pale cream frontal band ; (*b*) a faint but noticeable triangular brownish cap which is absent in Hooded hens ; (*c*) the complete absence of blue cheek patches which are always present to some degree in Hooded hens ; (*d*) the presence of pale pink abdominal feathers, also edged with white ; and (*e*) pale green subcaudals unlike the salmon of Hooded hens.

Immatures in first plumage closely resemble adult hens, but young cocks have faintly outlined black caps and bright blue cheeks. Both sexes show some trace of pink on the abdomen, but none on the subcaudals.

Illustrations

In contradistinction to the Hooded, this species has been frequently portrayed. As already noted, Smit's plate in Avicultural Magazine, July, 1898, facing p. 154, is reasonably accurate, especially of the cock, but rather misses the shape. Gould's plate, which is reproduced in Barrett's *Parrots of Australasia*, opposite p. 73, is quite good, especially of the hen, but the backs of the cocks are too greenish. Mathews' plate by Gronvold (Vol. 7, opposite p. 431), is very good of the cock except the mantle is too brown ; the hen is shown quite incorrectly as having brownish cheeks. Reichenow's plate (Pl. 23, Fig. 6) is fairly accurately coloured, but gives the bird the dumpy figure of a Red-rump. Cayley's plates in his *Australian Parrots* (Pl. VIII, Figs. 4 and 4*a*) are quite good for their size, as is his plate of a male in *The Emu* (Vol. 24, Pl. 1, lower figure). Renaut's plate in Seth-Smith's *Parrakeets*, facing p. 202, is quite shapely, but the lovely blue shades have been completely missed. Perhaps the best plate of all is a black and white drawing by the master psittacine illustrator, Goodchild, which appeared in *Bird Notes*, December, 1909, p. 271.

* * *

View of Garden Aviary from Study.
Painted light green on the outside, the building blends well with the lawn and evergreen shrubbery of the garden.

Interior of Compartment housing Softbills, showing planting of Shrubs, Ferns, and Grasses.

To face p. 95

A CALIFORNIA AVIARY

By Prof. CARL NAETHER (Encino, California)

Following Mr. Arthur A. Prestwich's suggestion, I am giving below a brief description of the aviary I had built at my new home in the San Fernando Valley. In planning it, my aim was to keep my soft-billed birds and foreign doves as safe as possible from nocturnal "visitors", such as cats, owls, opossums, as well as from diurnal "callers", such as mice, snakes, lizards, and even rats. Off and on, all these more or less destructive prowlers seriously troubled the occupants of my old aviaries—from above by crawling or settling on top of the wire-flight; from below by burrowing under and through the aviary floor.

In my new aviary, now 1½ years old, my birds have been troubled by none of the above-mentioned pests; consequently, there are no doves with bashed-in heads or injured wings, no nests deserted during nights of terror. Best of all, both doves and softbills, being no longer subject to sudden frights, are much tamer and gentler—they feel much more at home in their new aviary.

This aviary is a simple structure made of tongue-and-groove redwood, set on an 18-inch concrete foundation, most of which is sunk into the soil. There are ten pens or compartments, each 4 feet wide and 16 feet deep. At the front, the entire structure is 8 feet high, sloping to 6 feet at the rear, to facilitate a rapid run-off of water during the rainy season.

The *entire* building is roofed over, with sufficient overhang on the front and the sides, thus preventing cats, etc., from disturbing the birds from above. The building faces east, the various pens getting the benefit of the morning sun to a depth of nearly 6 feet, at which point the solid-walled shelter-portions begin. Growing ferns and shrubs likewise benefit from the daily morning sunshine. All floors are earthen.

In order to prevent mice, lizards, and other undesirable animals from entering the aviary through the wire-netting, I have used ¼-inch mesh all round the outside. And to render the interior of the aviary more visible from the outside, I have painted the netting on both sides with black enamel. Incidentally, ½-inch mesh also prevents birds from pressing their beaks into the netting and thus injuring the area surrounding the beaks, as is so often the case when birds dash against, and into, wide-mesh netting.

Natural light is provided amply, not only from the outside through the wire-netting, but also through windows placed in the rear-walls of the various compartments. Moreover, the back-walls of all compartments are painted white, as is also the whole interior of the first

two compartments, facing east and south, which house various male softbills. Ventilation, but rarely required, is provided by the windows, which slide open sideways, and which are covered with fine wire-netting on the outside to prevent escape of birds.

The aviary has but one, solid, outside door—the entrance. The doors to the various compartments, all screened, are located in the rear and in a straight line. Thus, I can go through the compartments without disturbing any of the occupants, since most of them prefer to stay away from the extreme rear. There is, of course, a sufficient number of hydrants to facilitate providing water for both birds and plants. Since we get neither snow nor ice in the San Fernando Valley, there is no need for artificial heating. In fact, at this writing, 1st December, the temperature is nearly 80° F., and as usual, there is warm sunshine quite early in the morning, and much enjoyed by the birds.

Each compartment is planted with shrubs to a depth of 3 or 4 feet to lend the aviary an informal and natural appearance. Moreover, both softbills and doves seem to like growing plants. All feed and water dishes are placed in the shelter (rear) portion of each compartment, where they can be kept clean and cool, and where they are readily accessible without disturbing the birds. Nesting facilities for the doves are likewise placed in the shelter-portion of the aviary, most of the species which I keep preferring to nest in shady and semi-dark places. The floors of the compartments in which softbills are kept are covered with fresh leaf-mould to a depth of 6 inches, which the birds "work over" time and time again in search of grubs and earthworms, and which is added to at frequent intervals.

Presently, the aviary houses various doves, such as Mountain Witch, Splendid, Bartlett, and Luzon Bleeding Heart, Ruddy Quail, and other species, as well as numerous species of insectivorous and frugivorous birds, including Yuhinas, Bluethroats, Rubythroats, Whitethroats, Redstarts, Bluebirds, also various tanagers and thrushes. Since *all* occupants have been doing well now for 1½ years in their new home, it is reasonably safe to conclude that they like it there. All species of doves, except the Splendid Pigeons, imported not very long ago, have reared young to maturity in their respective compartments.

All in all, I am very much satisfied with my new aviary since it affords my feathered friends sunshine and security day in and day out—and, what is also important, ample room in which to fly and to carry on nesting and other activities. The aviary, simple though it is represents a considerable monetary investment, which, however, is already paying dividends in that it provides increased comfort, security, and general well-being for all my birds and doves.

* * *

SOME OBSERVATIONS ON THE DIAMOND DOVE

By Derek Goodwin (London, England)

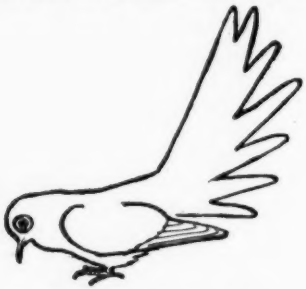
After I had, in the summer of 1956, left my former home at Virginia Water, I was for some time without any captive birds. In early 1958, however, I purchased a small house in south-east London. The density of the domestic cat population here does not permit anything in the nature of an outdoor aviary, but I soon managed to turn a spare room into an indoor one. Since the only small doves available in the dealers I could visit were Diamond Doves (*Geopelia cuneata*), a pair of them was purchased and installed; together with some Blue-breasted Waxbills and Golden-breasted Waxbills. To my surprise I could find no detailed information on the behaviour, or other points of interest, of the Diamond Dove in either the avicultural or ornithological journals in which I searched. I hope in this article to make some attempt towards remedying this apparent deficiency. My observations have been chiefly on my own pair and their progeny, of which were kept a cock and a hen till fully adult; but I have checked their behaviour with briefer observations of other captive Diamond Doves in zoos and bird dealers' collections, and corresponded with Mr. R. A. Richardson who also keeps Diamond Doves and has been kind enough to put his observations at my disposal. I greatly hope that anyone who can give further information will be stimulated to do so by reading this. Although the Diamond Dove will be familiar to most readers I will venture to describe it for the convenience of any who do not know it, since, personally, I find nothing so aggravating as trying to picture an animal I do not know and of whose appearance the writer does not inform me.

The Diamond Dove is the smallest of the Australian pigeons; being, indeed, one of the three smallest pigeons in the world. It belongs to the same genus as the larger Peaceful Dove (*Geopelia striata*) and the still larger Bar-shouldered Dove (*G. humeralis*). Although the *Geopelia* species show some general resemblance to turtle doves (*Streptopelia*) a consideration of their plumage characters, behaviour, and geographical distribution show, in my opinion, that their nearest relatives are the various Australian "bronzewings" (*Phaps*, *Ocyphaps*, *Petrophassa*, *Geophaps et al.*). The Diamond Dove is about the size of a Skylark but with a plumper body and longer tail. The cock has the head, neck, breast, and wing-coverts a soft grey, sometimes a little intermixed with brown. The back and scapulars are darkish, soft brown. The wing-coverts and scapulars are ornamented with small white spots, each with a narrow blackish border. The four long central tail feathers are dark, brownish grey; the next pair have white tips, and the remaining tail feathers have rather

more than the outermost half white. The iris is brilliant red with a narrow silver inner ring and the eye is surrounded with a wide circle of bright orange-red orbital skin. The undersides of the primaries, and those portions of their upper sides that do not show when the wing is folded, are chestnut. The female is duller than her mate, with more brown suffusion in her grey parts and with paler, more orange-pink orbital skin.

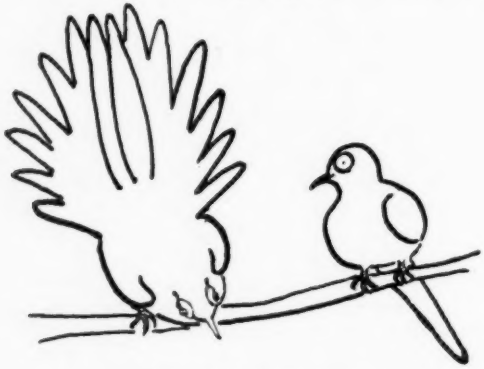
Display and Behaviour

The bowing display (for terminology of display and voice see Goodwin, 1956) is similar to that of the Bar-shouldered Dove except for the position of the head at the culmination of the bow (see sketch).



Bowing-display, side view.

The tail is fully raised and spread. Commonly the bow may be frontal but if, as very often happens, the hen is to one side of the cock he tilts his head, and sometimes to a less extent his body and tail towards her. During the bowing display and immediately before

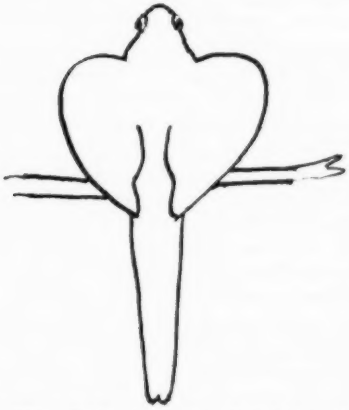


♂ Bowing to ♀ on same perch.

giving it the cock Diamond Dove arranges his head feathers so that a very slight peak is formed at just the place of the crest of the Crested Pigeon. Doubtless the same feathers are involved in both species and this seemingly trivial point (no pun intended !) is, I think, a further indication of their close affinity. The bowing display seems to be used only in sexual contexts as in the *Streptopelia* species (see Goodwin, 1956). I have not seen it used by female Diamond Doves or " between rounds " by fighting males. Further observations are desirable on this point, however, as the not very distantly related Crested Pigeon (*Ocyphaps lophotes*) certainly bows in hostile as well as purely sexual situations.

The Diamond Dove has two forms of a wing-lifting display very similar to and probably homologous with that shown by some *Columba* species. In the upright version the bird stands bolt upright (but with head held low, not with neck upstretched) and holds the folded wings opened more or less in line with the back. The posture is very close to that used by the male Common Bronzewing (*Phaps chalcoptera*) after copulation. In the Diamond Dove I have only seen it from the

Wing-lifting display, horizontal version.



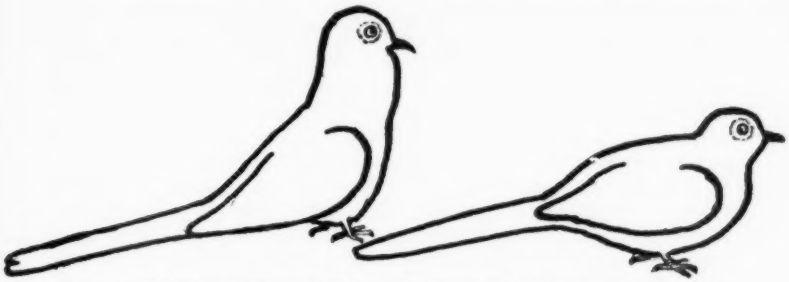
Wing-lifting display, back view of upright version.

sexually excited male. He flies a little way from the female (usually after displaying to her), alights and at once adopts the upright wing-lifting posture. Usually this strongly stimulates his mate, she flies to him and billing and copulation follow. The horizontal version of this display is shown when a male is sexually excited by a bird perched or alighting above him or (as in *Columba*) when another dove flies overhead. He then lowers his head and spreads his folded wings. I have seen low intensity versions of both forms of the display from an unpaired female who was " trying to attract the interest " of the male of her choice. It is extremely likely that these two different versions of this display (which will probably be found to intergrade) have reference to the position of the bird whose presence or appearance releases it. When the latter is on a level with or lower than the displaying bird the upright version will be used and when it is above the horizontal ; in either case the dorsal view of the flattened wings, with their pattern of white spots, being exhibited to the bird eliciting the display.

The nodding of the Diamond Dove is shown, like that of other pigeons (Goodwin, 1956*a*) in both hostile and friendly encounters. It is derived from nest-building movements and signifies the bird's intention of " holding its ground ". As in its relative, the Bar-shouldered, the Diamond Dove makes a quivering " twig-fixing " movement at the culmination of each nod, although in the present species the movement is usually less pronounced and may be only slightly indicated.

As in other doves (Goodwin, 1956*a*) " driving " of the female by the male is usually motivated by sexual jealousy ; the male tries to drive his mate away from any possible rivals. The male may, however (and the same is true of other pigeons), try to drive his mate from any place where he feels ill at ease or frightened but not sufficiently so to flee without her. Thus I have repeatedly seen a cock Diamond Dove drive his hapless mate because he was frightened at my presence, oblivious to the fact that she could no more escape from the room than he could. Similarly I have seen a cock domestic Pigeon drive a tame female Rock-Dove, with which he was mated, from a strange garden in which she (lacking the domestic pigeon's inhibition against alighting in strange places) had settled. When attacking an enemy, or while driving his mate, the Diamond Dove has a habit of jumping suddenly at the other bird, then pausing for a moment with upright head and swollen neck.

The mating ceremonial of the Diamond Dove is of particular interest in that whereas in *Columba* and *Streptopelia* the aggressiveness and fear involved are expressed only in symbolic gestures, in the Diamond Dove overt aggression is part of the ritual. After the usual billing the male mounts the female, gives a single coo, dismounts, at once



Posture of ♂ Diamond Dove (left) immediately after jumping aggressively at ♀.

utters a loud cry, and strikes the hen with his wing as he does so. He then remounts and repeats the process but dismounting on the opposite side and striking with the other wing. After this he mounts, gives a double coo, and then copulation takes place. Immediately afterwards he attacks the hen in a very formal manner. She flees only a foot or so from him, he draws himself up aggressively but does not pursue her, and they are on " friendly terms " within a few moments. Sometimes, but not often, the cock mounts, dismounts, and strikes the hen several times before copulating. Whitman (1919, p. 17) gives a description of the mating ceremonial of the Bar-shouldered Dove (*Geopelia humeralis*) which differs in some minor points from that I have described for the Diamond Dove, chiefly in that the male *humeralis* is said to " strike its wings together over its back ", not to strike the female. Whitman adds, however, that " *cuneata* does the same ". I cannot help feeling that there may be some mistake here, perhaps occasioned by the fact that Whitman's great work had to be compiled posthumously. If any reader can enlighten us as to whether *humeralis* and *cuneata* really differ in their mating behaviour, whether the Diamond Dove does at times strike its wings together over its back and not hit its mate, or whether the details of Whitman's description are at fault ?

Head-shaking is shown by the Diamond Dove, as by other pigeons (Goodwin, 1956*a*) not only as a response to physical irritation but also, apparently, as a response to some psychologically displeasing stimuli.

A sexually active adult will often head-shake whenever another Diamond Dove (other than its own mate) coos.

Nesting and parental care do not differ from the same behaviour in other pigeons. The eggs, however, are laid in the early morning, with an interval of only about twenty-four hours between them. Some writers on avicultural matters (since I must criticize their conclusions I refrain from giving references !) state that Diamond Doves are seldom good parents ; that they neglect the young after the latter leave the nest, if not before ; and that the young when they leave the nest fall

to the ground and are some days before they can fly. Now whilst some Diamond Doves may be defective as parents (and many more will no doubt be in the future if fanciers start breeding them for physical deformities as they do fancy pigeons, canaries, and Budgerigars !), I doubt if most are and I think the clue to their unsatisfactory behaviour may really lie in the food supplied. Certainly the very people who complain about their defective parental qualities often state that they need only their " usual seed " when rearing young. Now although pigeons produce crop milk and no doubt can, to some extent, make good deficiencies in the food obtained by drawing on their own bodies when feeding young there is no doubt that at such times they do far better if they have a richer diet than they would otherwise need. I find that my Diamond Doves, like all other species of pigeons that I have successfully bred in captivity, eagerly consume large amounts of " Kilpatrick's pigeon minerals " during the period of maximum bone and feather growth of the young. Unlike most other doves I have kept, my Diamonds will not take milk-sop or cooked egg when they are feeding young but they seem rather more eager for sprouted seeds and greenfood then than at other times. I supply them with maw seed *ad lib* (in addition to canary and yellow millet), Kilpatrick's minerals and crushed eggshell and give them fresh earth with sprouting seed in it and greenfood (fixed firmly so they pick pieces from the leaves which they cannot do unless the plant is firmly fixed) every day. So far this regime has been very successful. Although they are in a small room, not a nice large outdoor aviary, all the young hatched have been able to fly at eleven or twelve days old ; have not come to the ground until several days after leaving the nest ; and have been fed by the parents (who in each case have laid again and started incubation of the new clutch when the young were from ten to fifteen days old) until they were strong on the wing and quite capable of fending for themselves.

I suspect the other accusation often levelled against these and other doves—that they are incompetent nest-builders—is also due to human rather than avian incapacity. The room in which I keep my birds is fitted up with sundry branches and bits of trees. My Diamond Doves several times selected more or less " natural " sites among the branches but never managed to get a proper nest built unless I fixed some extra support for them. This was when I had supplied only fine twigs and grass stems gathered without much selection on my part. One day, however, I found a Jay's nest, in good condition, that someone had evidently thrown down. I took all the fine wiry twigs, rootlets, etc. from its inner part and threw them on the floor of the room. As a result the old pair of Diamond Doves in less than two days built a perfect nest among the branches, in a position where they had twice before tried, and utterly failed to lodge a nest.

The various comfort movements—preening, sunning, shaking, etc. of the Diamond Dove are the same as those of other pigeons. Mine do not appear to bathe, however, at least I have never seen them do so. Probably they would rain-bathe if they were in an open aviary.

Voice

In my previous paper on the voice and display of some pigeons (Goodwin, 1956) I said that the vocal utterances of those species of *Streptopelia* and *Columba* known to me could be divided into four basic calls, which I termed the " Advertising-coo ", the " Display-coo ", the " Distress-call ", and the " Excitement-cry ". Up to a point this terminology can be used for the Diamond Dove's notes, although this latter bird is far more loquacious and " talkative " than the other genera mentioned. The Diamond Dove has two quite distinct advertising-coos. One is a pleasant if rather sad, or anyrate " mournfully resigned " sounding " Coo-coo, coo, coo-coo ", and the other a two-note phrase consisting of a rather harsh, nasal-sounding coo (very suggestive to my ears of a human snore), followed by a " normal " coo. One could perhaps write it " Cor-coo " or " Coorh-coo ". At full intensity the advertising coos are quite loud and all the notes, except for the snoring " Cor " are very clear and " pure " in tone. At lower intensities they are less loud and clear, often higher-pitched and sometimes " broken " or varying in pitch. The female's advertising coos are always much less loud than the male's, although the female's " song " at very high intensity may be rather like a low intensity version from the male.

I can find no difference in the function or causation of the two forms of advertising coo when they are used as song or, as they often are at low intensity, as apparent contact notes between members of a pair. Mr. Richardson informs me (*in litt.*) that he thinks that the " Cor-coo " expresses a greater intensity of emotion. In my experience, however, the male Diamond Dove habitually varies his " songs ", uttering one or two " Cor-coos " followed by one or more " Coo-coo, coo, coo-coos " and so on.

The " Cor-coo " (but not the five-note advertising coo) is also used as a nest-call. When given by a nest-calling bird it is usually less clear and more drawn out, with the nasal tone of the first note more pronounced and often also permeating the final " coo ". Paired Diamond Doves very frequently utter rather quiet calls with the same nasal, snoring or growling quality of sound as the " Cor " note. These are given by members of a pair together on the nest site when one alights near the other, as if in greeting, or as contact notes. Usually if one of these calls is given by either male or female its mate at once answers. They intergrade completely into the full versions of the advertising coos and might be considered as nothing more than low

intensity variants of them but for the fact that they appear never to be uttered by solitarily-kept male birds (I have not been able to observe a singly-kept female) which, naturally, give the advertising coo with much greater frequency and at higher intensity than is usual with a paired male. The low nasal calls appear to function to express affectionate emotion between members of a pair and also as contact notes when they are fairly near to each other. They do not appear to be used in aggressive contexts and thus are not analogous to the excitement-cry of *Streptopelia* species although they are used in some situations where a " turtle dove " would give the excitement cry.

The display-coo is an emphatic " Ŏh (wă) " or " Coorh (wă) " the " wa " sound at the end being, apparently, an audible inspiration which immediately follows the cooing note. The display-coo is given in time with the bow and, because of its similar tempo, it is suggestive of the display-coos of both the Spotted Dove and the Turtle Dove.

The distress-call is a panting gasp, like that of other pigeons, but higher-pitched than in *Columba* or *Streptopelia*, due no doubt to the Diamond Dove's much smaller size. It thus has a somewhat different, more whistling and less grunting sound and this difference is heightened by the fact that the Diamond Dove nearly always gives a whole series of gasping distress notes strung together in succession before pausing. As in other pigeons it is given not only at the sight of a bird of prey or some other predator but also when the caller's feelings seem to be those of annoyance, discomfort, or indecision rather than fear.

When the male Diamond Dove strikes at the female prior to copulation he gives a loud " explosive-sounding " cry, suggestive, to my ears, of the " spitting " of a domestic cat in its defensive-threat display. This cry may possibly be comparable to or even homologous with the excitement cry of some *Streptopelia* species. It does not appear to be used, at any rate I have never heard it, in any other situation, not even by fighting or threatening individuals. However, in this connection it may be mentioned that the Mourning Dove (see Craig, 1911) has a call which is thought to represent the excitement-cry of *Streptopelia* but which it utters only immediately after copulation.

As compared with *Columba* and *Streptopelia*, or at least the species of those genera with which I am familiar, the Diamond Dove impresses one by its much greater " talkativeness ". The frequent calling and answering between members of a pair being suggestive of passerine birds. Similar behaviour is shown by the Bar-shouldered Dove and, according to Newman's (Newman, 1908) most interesting account, also by the Partridge Bronzewing (*Geophaps scripta*). Like other doves, the Diamond not infrequently coos at night often, apparently, as a response to some noise or other stimulus that has disturbed but not greatly alarmed it. Although the act of cooing might have a beneficial psychological effect (similar to that of a man who is a little

afraid whistling to himself in the dark) on the bird it is difficult to believe it can have any other function. One would indeed have thought it a habit that would have proved highly dangerous to the species indulging in it.

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Postscript :

Subsequent to writing the above I have, on four occasions, seen the old pair of Diamond Doves copulate when perched facing me at eye level and only a yard away. Each time I noted the following points additional to my previous observations.

(1) As the male struck at the female after billing, she crouched and his wing went just *over* her head and back, but did not appear actually to hit her. (2) Immediately afterwards the female raised her head, inserted her bill in the male's open mouth and they billed very briefly (only for a second or so) before he re-mounted. (3) When the male showed aggression immediately after copulation, no actual contact of his bill with the female appeared to be made. (4) Just before striking out at the female, the male's two wings appeared (the movements were so quick that I cannot be entirely sure) to meet over his back.

Since on all four instances the behaviour was the same, I think I must have failed to notice the above actions previously, when I had less perfect views, although I think that at least on some of them, billing did not take place between striking and re-mounting. It is now evident that the aggression involved is less overt than I had thought. Also that the behaviour is even closer to that of the Bar-shouldered Dove than my previous observations had suggested.

* * *

AUSTRALIAN PARROT KEEPING IN HOLLAND

By Dr. H. D. GROEN, Haren (Groningen), Holland

There is no doubt that there has lately been a great increase in the interest in Australian parrots in Holland and to-day we have many fine private collections owned by enthusiastic breeders with some experience. Besides there is a steadily increasing number of fanciers starting to specialize in parrot keeping. One of the causes of this flare-up of an old hobby might well be the presence of some very attractice bird parks in Holland, to mention only the well-known "Avifauna" at Alphen-on-the-Rhine and also the unique "Louise Hall" at Wassenaar, naturally working as a stimulus. Another factor surely is the ease with which parrots could be obtained in Holland. Owing to the activities of some big import firms, until recently huge numbers of birds, and specially of parrots, have been imported. We should, however, not rely too much on these imports in the future, in consequence of all sorts of restrictions either at home or in Australia. This article deals only with private collections, as in my opinion the aviaries of amateurs are actually the most suitable for breeding and establishing stock. Bird parks and zoos may be useful for propaganda purposes, but they are definitely not the places designed for breeding on a large scale and they will never be sources to rely on for future supply. Certainly there are some breeding results, but these results are inversely proportionate to the number of birds kept, owing to the disturbance made by thousands of visitors, specially during the breeding season.

For some years now a number of aviculturists have been attempting to build up breeding stocks of one or more particular favourite species, or of rarities which are difficult to replace in case of loss. Some of them specialize in *Neophemas*, others in the *Psephotus* group and again others in the larger sized parrots. It is my ambition to collect the entire range of the Australian Broadtails, that is to say all the Australian parrot-like birds except the lorikeets and the cockatoos, keeping only one or two pairs of the commoner species and trying to establish studs of the rarer kinds. Of course this may be a remote possibility as some species have not been imported into Holland so far. Further restriction is imposed dependent on factors such as space and time. Time, if you agree that the best thing to do is to look after your birds yourself. About thirty species of Australian Broadtails are now and again available to Dutch aviculturists. Keeping one pair of twenty species and three or more pairs of the rarer kinds to secure unrelated offspring, means at least fifty aviaries. Another ten aviaries for young birds and for quarantine quarters makes a total of sixty and this, I think, should be the limit if the job is to be done properly.

Space is another important factor. Some people unfortunately keep too many birds in too cramped flights and this undoubtedly does not encourage good health in birds which are to be confined in them for a long time. Other more fortunate breeders have their aviaries dispersed over a large area, thus preventing the pugnacious birds disturbing each other during the breeding season. Of course this has great advantages, but, on the other hand, one makes the collection more vulnerable to vermin, the structure is more costly, and feeding, etc. takes a lot of time.

My aviaries are built in a closed space with separate fence and are constructed in rows with communicating doors between the compartments. Closely related pairs are housed as far away from each other as possible. The length of the flights varies from 36 yards for the largest parrots to 14 yards for the *Neophemas*.

The following systematic enumeration of the species deals only with birds in my aviaries, or in the collections of other Dutch amateurs, and consequently is not complete.

Genus *Polytelis*.

Princess of Wales' Parrakeet. Though our stock of these delightful birds is not substantial there has been a definite increase in numbers during the last few years. I have three pairs in stock for the coming season and last year two pairs successfully reared twelve fine young, one pair being double-brooded. There is a great demand for hens, most breeders having a surplus of young cocks.

Young males are not difficult to distinguish as they start bobbing up and down almost as soon as they are independent. Though not frequently, they may perform this premature display a few times a day. These birds were caught and separated from the others as there is at that stage no other obvious sexual difference and time proved that it was correct.

One often hears of broken eggs. Maybe it is just luck that so far I have not had one spoiled egg, or is it because my logs are placed in a very sloping position at an angle of about 40 degrees from the ground to prevent the birds from falling or jumping on the eggs? Moreover, a strip of wire netting is nailed on the inside of the logs along which the hens go down.

The Barraband's Parrakeets don't seem to be valued as much as they should by Dutch fanciers and consequently the few that are bred silently disappear over our borders. I have two pairs now and the old pair reared three young (two males and one female) the past year and five young (one male and four females) the year before. There is also a fine breeding pair in the parrot collection of Dr. Doctor van Leeuwen at Tiel. At a rough estimate we have altogether eight pairs in the country rearing some twenty young every year. Very scarce at

the moment are the Rock Peplars. Although there were various breeding successes in Belgium and Germany, not one successful breeding was reported in Holland during the past season. I acquired some imported birds a few years ago, but it soon became apparent that they were infected with the dreaded eye disease and ultimately they died.

Genus *Aprosmictus*.

My only pair of King Parrakeets has so far omitted to take any interest in matrimonial affairs. These birds were imported from Australia six and seven years ago in immature plumage. Every kind of nesting accommodation has been supplied each year, including very long logs and natural hollow tree trunks in the open flight. During the past season feeding was noticed for the first time, but the birds came into a heavy moult early in July, so that was another blank year. I know two owners with good breeding pairs, but though all eggs were fertile, they failed to hatch, probably owing to the abnormal dryness last year. Before the prohibition of the importation of parrots from Australia in 1957 these majestic birds were imported into Holland quite regularly, but at present they are not offered. I consider myself lucky to have one good breeding pair of Crimson-winged Parrakeets, having bred and reared young for the past two years now (two and two). Though there are one or two males in different collections, pairs are extremely rare and I know of only one more breeding success the past season by Mr. van Heyst, who has three pairs in his collection. We have seen here a variety of these lovely birds, being smaller and even more brightly coloured, but more difficult to acclimatize. According to the information these birds were imported from Dutch New Guinea.

Genus *Purpureicephalus*.

Red-capped Parrakeets have been imported spasmodically in small numbers in the past. I have been unlucky with this species, having lost two hens this year and no breeding results. My birds are obviously wild-caught specimens, very unsteady and shy as are all the others in Holland. Consequently owners of these birds initially don't get much joy out of them. We are looking forward to some aviary-bred birds, but though Red-capped Parrakeets have been bred years ago, breeding successes have not been reported in Holland since the last war. During the past season at least one brood of Red-capped Parrakeets was reared in Germany and another in Belgium. There is another thing, since keeping Australians only and having disposed of all the other parrot-like birds, I had forgotten about the destructive disposition of some parrot species. Now the Pileated have reminded me of this undesirable habit.

Genus *Platycercus*.

Common Rosellas and Golden-mantled Rosellas are well-established and can be seen in many aviaries all over the country. There are usually two or three pairs in my collection, rearing a number of young every year. Also the Stanley Parrakeets are fairly numerous and steadily increasing, though it is still difficult to supply sufficient birds to the growing number of fanciers who start parrot keeping. Well-established strains of Stanleys are kept by Mr. Danklof at Udenhout and Mr. Westerweel at Zwolle. I used to have three pairs rearing broods of four and five young, but always being single brooded. Last year two pairs were exchanged for other species. The only pair left for the first time had infertile eggs, but made themselves useful by incubating five Pennant's eggs, of which four hatched. These four young Pennants were successfully reared by their foster-parents. But for the first time I had no young Stanleys. Pale-headed Rosellas have been the steadiest breeders in this collection. The past season seventeen healthy young birds were reared from two pairs, both being double-brooded. One of these pairs also reared two young Pennants, which grew up with the young Mealies in the same nest. It always comes in handy to have a good many breeding Rosella hens for brooding deserted eggs, as all Rosellas rear related Rosella species without trouble. Golden-mantled have successfully reared young Mealies, Stanleys, Pennants and vice-versa in my aviaries. Mealies are very popular and much in demand, but are still not too abundant. When I started with this species eight years ago, aviary-bred birds were difficult to get so imported stock was bought. These appeared to be very delicate and out of the eight imported birds four died within a month. Of all the aviary-bred birds I have since bred, so far I have never had a casualty.

Not as reliable regarding breeding in my experience are the Pennant's Parrakeets. One old hen produces great numbers of eggs, this year twenty, but always neglects to brood. Yet with the aid of the Stanley and Mealy foster-parents six young Pennant's fledged. Many people possess Pennant's, mostly imported birds and unlike the Pale-headed Rosellas, imported Pennant's have proved to be much stronger. Adelaide Rosellas, though imported regularly in the past, are definitely not so popular here as in neighbouring countries. There are less than a half-dozen pairs in Holland. So far I have not secured a pair, but as they are still offered now and again, they will be included in my collection for the sake of completeness. Brown's Parrakeets are now very scarce and I know of only one good pair, always starting to breed in the first half of August, just in time to get a nest of young ready before the winter. Unfortunately just recently the old hen died, so this may be a setback for years.

Yellow-rumped Rosellas and also Tasmanian Rosellas are almost

non-existent here. Mr. de Graaf at Roosendaal has a good breeding pair of the first mentioned species and I had a pair imported, but both birds died within a couple of months. Also very rare are the Port Lincoln, the Twenty-Eights, and the Barnard's Parrakeets. Breeding successes have not been reported lately.

Genus *Psephotus*.

The Red-rumped Parrakeets are firmly established and are very popular, specially with beginners. They were the first birds in my collection and proved very prolific. Later my stock was reduced to only one pair. Yellows seem to be very abundant in Belgium since a few years and are now invading our country from the south. Many-coloured Parrakeets are not numerous, probably owing to their reputation of being very delicate. I wonder if they really are. These attractive aviary birds were imported regularly until recently, but most of them seem to have found their way straight abroad. At a rough estimate there are not more than ten breeding pairs in the country. I possess one pair and efforts will be made to increase this number in the future. The three pairs of Blue-bonnet Parrakeets at present in Holland are all of the yellow-vented race, the least rare variety, if I am right. Breeding successes seem to be almost unknown. Before the last war it was Dr. Polak at Amersfoort who had success with this species. A pair of the red-vented race produced a clutch of four eggs in 1937, but the hen failed to brood. The four eggs were incubated by a hen Red-rumped Parrakeet and the three young hatched were fully reared. Hooded Parrakeets are almost unknown, not only in Holland, but also in other countries on the Continent. There are only five birds in this country. Mr. Breed at Heilo, who is concentrating on the smaller-sized Australian parrakeets, has two pairs of Hooded Parrakeets in his collection but I possess only one hen. If it is impossible to obtain a cock, I shall mate her with a cock Many-coloured and hope to breed the pretty hybrid, which is said to resemble the Paradise Parrakeet so much. Hoodeds have also been bred by Dr. Polak on two occasions, in 1937 and 1938 (four and three young). These birds nested in an ordinary wooden nest-box. Finally, I would like to mention the two couples of lovely Hooded Parrakeets I have seen in the extensive Moscicki collection of Mr. Melides at Brussels last year. I do hope he will get some young Hoodeds this year.

Genus *Neophema*.

With Elegant Grass Parrakeets Dutch aviculturists definitely have missed their chance. I have seen cages full of them at the importer's office and yet where have they all gone? It is said that this species is more or less domesticated in England, well here they are not. They are not as spectacular in appearance and not so brilliantly coloured as

Turquoisines or Splendids, but they are attractive with their golden-olive colouring. There is only one pair in my collection, but attempts will be made to get breeding stock of this neglected species. The same applies to the Blue-winged Grass Parrakeets and it is estimated that there are not more than five pairs in the country. Only recently I acquired an adult pair and hope to get some offspring this season. The brilliantly coloured Turquoisines are increasing well in numbers every year. This species is much in demand and more and more fanciers start keeping them. We have a number of aviculturists possessing fairly good strains of Turquoisines and with careful management we might be able to maintain a healthy breeding stock. There are now four pairs in my collection. Not so good are the prospects with the Splendid Grass Parrakeets. These gorgeous birds are still very difficult to obtain and I am glad to have at least one pair. Only two people possess a reasonable stock and it is to be hoped that after the coming season a few young birds will come on the market. Bourke Parrakeets finally are very abundant nowadays and increase by leaps and bounds so that they may be considered domesticated. Some birds I have seen are hardly any more coloured than sparrows, probably owing to inbreeding, not only here but doubtless already before they get here, if one considers that the breeding stock in Australia probably originates from a few wild-caught birds. On the other hand one encounters many very attractive, brightly coloured Bourke's here. My three breeding pairs are of decent size and colouring and they have been very steady and reliable breeders for a number of years now, rearing together between fifteen and twenty young each year in two broods. A third brood is always discouraged and prevented if possible. Mr. Stijger at Halfweg, keeping a stock of fifteen regular breeding pairs, reported a yellow colour mutation last year. I had a cinnamon mutation, but this bird appeared to be very delicate and died when about six weeks old. Incidentally, there are two of the same colour mutations in Belgium.

I have just been informed that since the 1st January, 1960, the entire export of native birds from Australia has been stopped, also of those harmful parrot species not protected by law and of which thousands are allowed to be shot or poisoned by farmers, even during the breeding season. Far be it from me to question the strong reasons for this prohibition, but it seems contradictory to protect these same birds by an export ban. However, if this measure is permanent it means a serious threat to aviculture as we cannot dispense with an occasional fresh supply from the homeland of our parrots. To counteract this menace somewhat, in my opinion, the best thing to do is that all " psittaculturist's " unite in rural societies such as already exist in Belgium and Germany. Once or twice a year members should forward a list of all species in their possession with wants and exchanges. In

this way we would know exactly what we had and an overall organization could take care of making the useful contacts, so that breeding could be co-ordinated and the quality of our birds improved by introducing unrelated blood into our stocks. This is very important, especially with regard to those rare species of which there are only a few birds present in the different countries on the Continent and in Great Britain.

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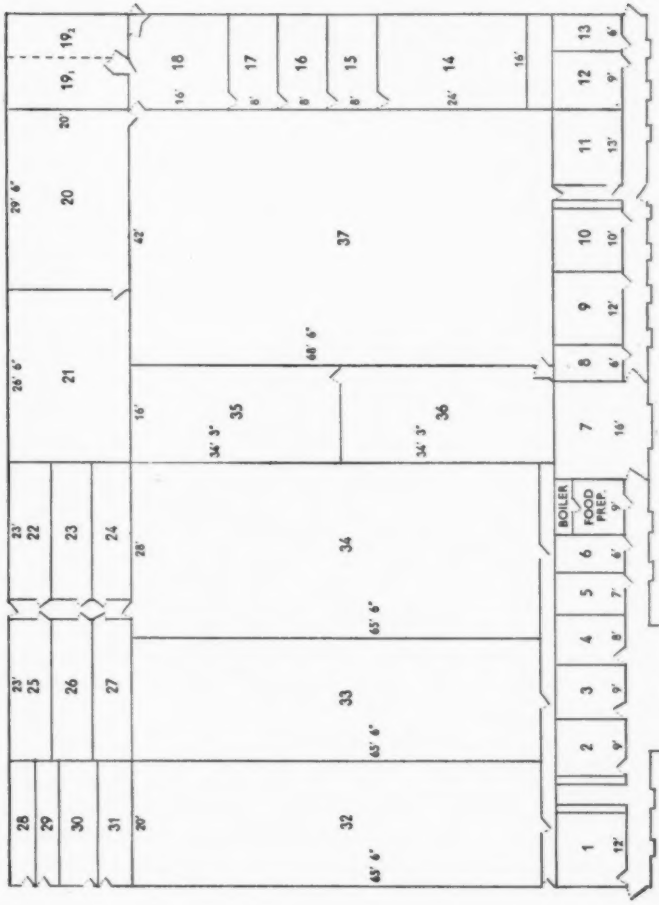
THE EDWARD MARSHALL BOEHM AVIARIES, TITUSVILLE, NEW JERSEY

By C. EVERITT (Titusville, New Jersey, U.S.A.)

Having recently taken over as curator of the above aviaries which are located in New Jersey, most aptly called the Garden State of the United States, I feel that a description of the establishment will be of interest to all aviculturists. From the correspondence and trans-Atlantic telephone conversations my wife and I had had with Mr. Boehm we had prepared overselves for a varied collection of birds ; but the picture we had built up falls far short of the actual. The aviaries are sited on wooded, rising ground facing due west and overlooking the Delaware River which flows serenely along about 150 yards below. At least it is flowing serenely at the present time, although a few years back it completely overflowed its banks and the force of the flood washed away the stone bridge which had been erected at Washington's Crossing, about a half mile down from Mr. Boehm's residence, in commemoration of the crossing effected about 180 years ago.

Due to the magnitude of the collection, it will not be possible to do it justice in one paper ; and, therefore, I shall confine myself here to a description of the bird-rooms and aviaries, some of the latter being still in the course of construction. A plan of the layout of the establishment can be seen on page 113 from which it may be observed that, whilst the main objective has been to ensure compactness, no sacrifice of space has been made to achieve it. The various bird-rooms and aviaries are all numbered on the plan so as to assist in following the descriptive details hereunder.

On entering the driveway one is faced by a long, low, white-painted building which can be entered by either of one of two glass panelled doors at the head of flights of seven stone steps. Behind these doors are located the rooms numbered 1 to 13 on the plan referred to above. They are all 11 feet deep, 8 feet high, and of varying widths, as shown on the plan, with the exception of room number 7 which is



THE EDWARD MARSHALL BOEHM AVIARIES

15 feet deep since it extends to the complete depth of the building. The entire building is heated by a hot-water system, the temperature being thermostatically controlled at 55° Fahrenheit. This installation is operated by an oil-burning plant located in the rear portion of the food preparation room which is between numbers 6 and 7 on the plan. They are all illuminated by mechanically controlled lighting, the lights coming on at 4.30 p.m. in the winter and remaining lit until 7 p.m., with a dimming period of fifteen minutes prior to extinction. There are not separate perches as such in these indoor flights as they are all fitted with two or more sawed-off tree trunks of about 6 inches in diameter into which holes are bored at various angles and positions in order that trimmed tree branches can be fitted therein. These can be changed whenever they are soiled, thus providing clean and natural footholds for the birds. Care is always taken to ensure that no branch is placed immediately below another so as to avoid any unnecessary soiling of the birds' plumage by other inmates. Each " tree " is from 6 to 7 feet in height and is mounted on a cross-piece base so that it can be readily moved about as required. However, there are exceptions to the use of " trees " in these rooms and this applies to those numbered 1 and 7. Both of these are planted and landscaped to provide accommodation for particular species of birds. Everything possible has been done to make these two compartments complete aviaries in themselves, and they are planted with such vegetation as a camellia tree, banana trees, Malayan fern tree, philodendron, hibiscus, grape, and English ivy, begonias, firecracker plant, etc. ; and in room number 7 there is constant running water and a pool of varying depths planted with water lilies.

With the exception of the last-mentioned room which extends the entire depth of the building and to which access may be obtained from both portions of the frontal corridor, each has an entry from this main passageway, the remainder of the retaining partition being glazed half-way down so that a clear view of the birds can be obtained at all times.

It will be noted from the plan that between rooms 1 and 2, and 10 and 11, there are spaces. The former houses twelve cages, six on each side, of 44 inches long, 16 deep, and 18 high. Below these cages are forty specially fitted drawers for the breeding of mealworms so as to supplement the regular supply in the times of scarcity and during the breeding season. Incidentally, I should like to mention here that the mealworms received are imported from Germany, and this fact alone shows the importance of endeavouring to be semi-independent ; for in the time of adverse weather conditions, receipt of supplies is unavoidably delayed. In the second space, i.e. between rooms 10 and 11, there are but six cages, each 44 inches by 18 by 24 ; but this area also serves as the means of access to an outdoor aviary. Between

General View of the Edward Marshall Boehm Aviaries. *To face p.* 114

Bird-room No. 7 of the Edward Marshall Boehm Aviaries.
Scarlet-breasted Sunbird on Malayan Tree-fern, Egyptian Plover at bottom left foreground; Fairy Blue Wren at top left background.

To face p. 115

rooms 6 and 7 is the food preparation and boiler room referred to earlier. This is equipped with a deep-freeze, refrigeration, electric stove, mincing machine and mixer, and with a sink unit to which there is a constant supply of hot and cold water. In addition, there is storage space for the various fruits and other ingredients used in feeding.

From the indoor rooms we now proceed to the outside aviaries of which, excluding those in the Parrot House, there are eighteen. Those numbered 14 to 21 are all separate aviaries planted with local shrubs, creepers, and trees. Some are wired with ½-inch by 2-inch meshed wire, and others with 1-inch by 2-inch wire. In addition, aviary number 19 can be made into two of 20 feet by 8 feet each ; otherwise they are all 10 feet high and of the varying dimensions as indicated on the plan. Their primary purpose will be for breeding-quarters of selected species of birds which can be left in open aviaries the year around. The Parrot House is an erection of 50 feet by 20 feet and consists of six flights of 23 feet long, 6 feet 8 inches wide, and 10 feet high ; three of each such flights being on each side of a central passageway which provides separate access to each flight. The building is heated, controlled at 50°, and is intended for the housing of lories, lorikeets, and other less hardy psittacine species which cannot be left outside during the winter months when the temperature here frequently drops to 13° below freezing during the night and does not rise above 30° by day. Backing on to the Parrot House, that is the extreme top left-hand corner of the plan, are four all-metal flights of 20 feet long and 12 feet high. Two of them are 6 feet wide and the other two 4 feet. These are for breeding pairs of cockatoos and hardier large parrots.

Now there remain only the six large planted aviaries of which three, numbers 32, 35, and 36 are heated, controlled at 55°, so that they can be used the year through for the housing of tropical and less hardy species. The largest of these aviaries is number 37 and is some 68 feet long, 42 feet wide, and, at the top of the arched roof, 26 feet high. It is constructed of tubular steel covered with inch galvanized wire netting. There is a large pool fed by a constant flow which cascades into it over an artistically constructed waterfall. The edge of the pool is planted with low shrubs and the rocks forming the fall are covered with climbing plants and sheltered by overhanging conifers. The outer surroundings are planted with rhododendrons, heather, and azaleas with native trees interspersed. Next to this are two of the heated aviaries referred to above. These are interconnected and of 34 feet long, 16 wide, and 10 feet high, and are planted with rhododendrons, forsythia, and fir trees. During the winter months, they are completely covered with polythene screens which make them entirely weatherproof.

The remaining three aviaries are all fitted with arched roofs, two of them being 16 feet high, and the other 20 feet. That numbered 32 on the plan is roofed with plastic fibreglass from the height of 6 feet from the ground. This lower portion is fitted with ½ inch by 2 inch welded wire over which is fitted polythene panels during the winter. It is planted with a varied collection of tropical and semi-tropical plants and trees and, at the far end is located an artistic waterfall which provides a constant flow into an ornamental basin below. The other two are also planted but all with native trees, shrubs, and plants ; for they are wired only and unheated. In number 34 there are two pools, one at each end, which are connected with a constant running stream. These aviaries, like the others mentioned earlier, are used primarily for the housing of all the year around outdoor birds ; although other species may be introduced to them during the warmer weather only.

With all of these natural surroundings, it is hoped that there will be some more successful breedings in the future. I say more for in 1959, Mr. Boehm had successful results with Scarlet-breasted Sunbirds and Blue-winged Sivas. With regard to the former, whereas the sire bird has lost his original deep colouring, the offspring, a male bird, is just coming into colour and the breast feathers are coming through of the same shade of red as with a freshly caught bird. This sets yet another poser for the various theories that have been evolved regarding the retaining of the red colouring matter in the feathers of certain birds. I hope to be able to give further details of this Sunbird breeding at a later date ; but I fear no data will be forthcoming regarding the Blue-winged Sivas. This was a case of releasing a pair into an aviary and the winter roundup disclosing that the family had increased. Doubtless there will be similar unprewarned breedings in the future for, with the ample supply of natural surroundings, many nests could be completely concealed. Nevertheless, as much safe observation as possible will be maintained, always ensuring that there is no undue disturbance of the birds.

In a manner comparable with the housing of his birds, Mr. Boehm believes in feeding them well. No rationing of mealworms is undertaken beyond ensuring that the weekly supply does last the week. As mentioned earlier, every effort is being made now to breed a supplementary supply. The feeding of seedeaters follows a pattern similar to that in practice in England except that with parrakeets, this term including Budgerigars, there does not seem to be the same emphasis paid to the feeding of additional proteins, as is the general custom in the United Kingdom. However, every attention is given to the protein factor in the feeding of softbills and nectar-taking birds. In addition to a special soft food comprised of soya flour, fine biscuit meal, ground fish and shrimp, dried flies and ant eggs, meat and liver meal, clofood,

and a vitamin mixture to which is added minced hard-boiled egg prior to serving, the birds are also fed with blueberries, sweet cherries, grapes, apples, oranges, and cooked sweet potatoes. They are also given raw minced beef hearts and a fruit mixture consisting of minced carrot, apple, banana, orange, and fig, to which is added an equal volume of lightly-boiled rice. The nectar fed is made up of corn syrup, honey, Gerval protein, beef extract, Abdec, yolk of raw egg, and skimmed milk. These constituents are all beaten up together and a sufficient quantity of cold water is added to the mixture to make it suitably dilute.

As I stated earlier, there is not sufficient space now to include even skeleton details of the species of birds kept ; but I will endeavour to make up for this omission at a later date. It will undoubtedly be even a bigger task then than it is at the moment, for Mr. Boehm is leaving shortly on a collector's trip and plans to visit Kenya, Ceylon, India, and Australia, and may even take in the Far East if time permits.

* * *

BREEDING OF PINK-FOOTED GEESE

By A. W. S. Dean (Grantham, Lincolnshire, England)

(Continued from Vol. 64, No. 3, page 98)

In my previous article, I did not state that No. 1 goose came from Mr. J. C. Laidley, also that No. 5 gander was from Colonel A. A. Johnson. Also there was a mistake, on page 97—27*th October* should read " Gosling rather slimmer and *appears* longer on legs than adults ". As a matter of fact the gosling is now a rather large gander and I wonder if we can feed birds too well in captivity and as a result they grow larger than in the wild state ; this needs watching.

1958. February–March were very bad months, with long periods of continuous day and night frosts and by April it did not seem as if many birds would breed. The old Grey Lag goose died in February, also two Silkie-cross hens that roosted in the trees in the orchard died in March and June. I think these deaths were due to the weather conditions early in the year. The ducks sat very late and had a great many clear eggs and the summer weather was awful. During *June*, No. 4 Pink-footed Goose had been seen round the old nest and later made a scrape some distance away by some bamboos, but never laid. I feel that a possible reason may have been the pruning of some shrubs not far from the old nest (although this was done in April), the weather, or disturbance by vermin.

27th August.—1957 gander heard squeaking—very low voice. It was about seven yards away.

16th November.—Fog. A wild Pink-footed gander came straight down on to the pond and stopped about an hour.

9th April, 1959.—Young 1957 gander still squeaks and keeps a good deal to itself.

4th May.—Killed Stoat and found nest of young in garden. This may have caused trouble in the past.

10th–11th May.—Pink-feet treading.

12th May.—1957 gander has much better voice.

18th May.—Silkie-cross hen laid first egg. She is the only hen left and laid no eggs in 1958. This year she laid and went broody three times. I mention this because I think it shows what effect weather can have on birds.

22nd May.—No. 5 gander treading No. 4 goose. By now the geese had divided up as follows—No. 5 and No. 4, No. 2 and No. 3, 1957 and No. 1. The last two can hardly be described as paired. The old goose is not now quite so active and likes sitting in the sun, the 1957 gander goes off a good deal by himself, but comes to stand or sit by her quite often. His voice is still not fully formed.

23rd May.—Nos. 5 and 4 sitting by bamboos where the 1958 scrape was. I believe an egg was laid, if so, it was covered and I could not see it. The gander saw off the Barnacle gander from the area.

24th May.—They were at the nest several times.

25th May.—On or near nest several times.

3rd June.—Goose has not been seen off nest for several days. Gander never leaves her except to feed ; if he sees anyone near he returns to her at once.

22nd June.—1 p.m. the goose looks a little fluffed out on nest. 8 p.m. possibly goslings hatching.

23rd June.—9.30 a.m. egg-shell outside nest. 1 p.m. looks like gosling out from under goose. Gander hisses. 4 p.m. gander hisses more than ever. I think I saw two goslings. 8 p.m. goose still on nest.

24th June.—7 a.m. gander making a lot of noise and running up and down with two goslings. It would seem that he had gone to feed at his usual feeding place and the goslings followed. On finding this out he lost his head. I went to him and on seeing me he returned to the nest and they followed. 8 a.m. gander feeding without goslings. 8.30 a.m. goose still on nest, no goslings visible, gander by her. 12 p.m. goose off nest some yards away but sitting down, there were thought to be four goslings—one egg left in nest containing an undeveloped embryo, it measured 76·5 mm. × 53 mm. 2.15 p.m. gander, goose, and four goslings on pond. 4.30 p.m. gander, goose and goslings right at top of orchard in long grass, they did not come to feed. Did they take the goslings up there to be out of the way as there were at this time a brood of Barnacles and two broods of ducks besides non-breeding birds?

25th June.—8.30 a.m. still up in long grass ; the gander led the brood and seemed to look for ways for the brood to get through the long grass, all movements very slow indeed. 11 a.m. on pond, one gosling seems a little weak and hangs back from the others. Two of the goslings were definitely bigger than the other two, I should think they hatched first. 4 p.m. on pond again ; as far as I know, they never went back to the nest. The goslings seem yellower than those of 1957, though it may well be just a better light. The Barnacle gander was very noisy while his mate was sitting, but quietened down as soon as she brought off the brood. The Pink-footed gander was just the opposite.

26th June.—2 p.m. the goslings have not been seen at the food troughs. I should mention that when the first ducklings hatched I tried throwing meal on the water and at once found that this was no use, so I put down some concrete open-ended troughs with $\frac{1}{8}$ inch water in them at one end and $\frac{1}{4}$ inch of water at the other. The ducks brought their youngsters to these straight away ; the same happened with the geese and I must have fed them about five times a day. The last feed was very late after all broods had gone to bed, so that there was something there very early in the morning. I never had any trouble with non-breeding birds touching the feed. 4.30 p.m. Pink-foot and goslings came to food trough.

27th June.—4.30 p.m. Pink-foot and goslings a long time at food trough—it looked when examined as if they had fed—they also seem to have been at the sand, I always put some in the troughs. The young birds consume a good deal—goslings also eat lettuce on the pond.

28th June.—The goslings came to every feed ; they have now become goose-shaped instead of egg-shaped and are rather more active.

29th June.—Goslings definitely eating meal. I saw them sitting outside goose in the sun, in the afternoon they went for a walk along a narrow bank with a 2-foot sheer drop on one side ; quite an adventure at that age.

4th July.—Pink-foot and goslings sitting in shade of bushes in hot sun.

6th July.—Goslings beginning to get much more independent of parents.

7th July.—Goslings thought to be picking up wheat in shallow water.

8th July.—Gander leads brood, goose brings up rear.

13th July.—Gander and goose nothing like so weary as they were when goslings first hatched—now quite bold. Goslings eat quite a lot of wheat. Lawn grass mowings have been fed to all the wildfowl since early April.

15th July.—Goose has lost primary wing feathers.

26th July.—Just about at the end of a large supply of lettuce. I find there is nothing better for young geese and ducks, especially when grass is very dry. Goslings just beginning to show pink on bills and legs.

6th August.—Goslings look very smoke-grey—the same as the one did in 1957.

8th August.—Caught goslings and wing clipped them. No signs of sex by behaviour on this occasion. They will need clipping again, as when you clip you must not clip down to the blood in the feathers or these will come out and grow again. By the way, I have found out that with both wild-caught and home-reared birds, if you are late in clipping and they fly out, the first time they will walk back to the fence and can be picked up. If you flush them and they fly in you never get a second chance, this applies to geese and ducks.

13th August.—Moved food troughs out of water on to land, as they were getting very messy. Food consumption now going down, all young birds have now got flight feathers, this is probably the reason.

27th August.—Birds not so interested in lettuce now—they get plenty of lawn mowings.

28th August.—Wild Garganey drake in eclipse on pond during day.

29th August.—Goslings now all much the same size, though the early two are slightly the biggest—1957 gander still more smoke-blue than older geese, but not very noticeable.

3rd September.—Goslings just showing white flank band.

26th September.—Caught goslings and clipped wings again, also leg banded. You should be able to clip up to 4 inches for first time and second time 3 inches. I clip seven feathers. The feathers were by now completely free of blood. We had hoped to get a good indication of sex this time by behaviour on catching and caught the two smallest first (they were the last two to hatch) and I would say by behaviour they were definitely geese. I then caught the bird that looked most like a gander. It very much was one, hissed, bit, and struggled to get away, very strong. The last one gave no indication either way and I am by no means certain what it is. A guess would be a gander, but I may well be wrong. On banding we found the first two had thin legs, the next much larger, and the third intermediate legs. We put the birds back in the catching pen after handling and let them all loose together.

6th October.—Immature Pintail drake arrived about now and stopped till 20th November. It was very tame, it had no leg band.

28th November.—Had a good look at the Pink-footed brood. There may well be only one gander. They look very like the old birds in colour, but are more smoke-grey and possibly not quite so large. White flank bands showing well, but not quite fully developed.

Having now reared Pink-footed geese in an enclosed pen and in the open, I can say that it is very much easier to make notes on goslings when they are kept in small pens, but you get no idea of the parents' behaviour unless they have more room. I am keeping this year's goslings with the others in the orchard in order to see what

happens next. It will be interesting to see how the old birds move the young off when they start nesting again, also how the young pair up ; or will they continue as four birds together ?

* * *

BRITISH AVICULTURISTS' CLUB

The Hon. Secretaries gave a Dinner confined to Founder Members of the Club and Officers and Council Members of the Society, at the Rembrandt Hotel, on 14th March, 1960.

The following Founder Members were present : Miss P. Barclay-Smith, Captain A. A. Clarence, Dr. E. Hindle, H. J. Indge, Miss E. M. Knobel, Miss M. H. Knobel-Harman, P. H. Maxwell, D. Seth-Smith, and E. N. T. Vane.

Council Members : Dr. F. B. Lake, A. Lamb, G. S. Mottershead, Sir Crawford McCullagh, Bart., K. A. Norris, W. R. Partridge, T. Spence, and J. J. Yealland.

Guests : Mrs. D. Seth-Smith and Mrs. H. M. Vane.

* * *

NEWS AND VIEWS

J. F. Brauckmann, Pretoria, South Africa, is to be congratulated on his success in breeding second-generation Meyer's Parrots. About six years ago a pair nested : first nest, three eggs, three hatched, one reared ; second nest, four eggs, two young reared. Soon after both parents died.

All three young ones flourished and in 1959 a pair nested : first nest, three eggs, two hatched and reared ; second nest, four eggs, three hatched, two reared.

* * *

Three recent instances of longevity. Mrs. Colleen Clancy, Glendale, California, has just lost her Cockatiel " Mike ", nearly twenty-nine years old. A Gilt-crest Humming Bird recently died after living in the Cleveland Zoo, Ohio, for six years and twenty-one days. A male Costa Rican Quetzal *Pharomachrus mocinno costaricensis* in the Bronx Zoo, New York, since 9th October, 1942, died on 20th July, 1959, after an accident in which it sustained a badly broken leg.

* * *

A correspondent in America asks for further details of the Fabergé gold bird-cage mentioned in the January–February number of the MAGAZINE. Frank Davis gives an illustration in *Country Life*, 24th March, 1960, and describes it as a " gold cage [3¾ in. high] containing a parrot carved from a single piece of translucent white

opal : it has ruby eyes and gold legs and claws, and is perched on the gold swing. The cage has a small door and double feeding trough, one side containing gold seeds. The circular base is chased with a narrow band of foliage. It was almost irresistible, I thought, and so did many others, for it realized 950 guineas ".

* * *

News items being a little scarce, now seems a good opportunity to recount what must be the most astonishing breeding experiment ever made.

In 1903 Gilbert Lee decided to attempt to breed Grey Parrots. He gives an account of the extraordinary albeit successful event in *Aviculture*, 1930, 255. He writes : " I purchased seventeen and placed them in a loft in a friend's cow barn in Jersey [U.S.A.]. Three years later sixty-seven birds had been added to the original number placed in this loft and eleven skeletons were found. The birds never saw a human being after being placed in their loft, consequently no pictures were taken. The experiment was really quite novel and one that I do not think should be printed at this time because of the lack of detail that bird lovers will want to know about.

The entire loft was lined with ¾-inch wire netting to keep out the rats and to allow climbing around. There was a continuous water supply regulated so that two or three porcelain dishes were kept filled, and the attendant saw to it that there was a slight overflow from these raised dishes to keep the four or five inches of sawdust that was scattered over the floor damp and cause some rotting.

The nests were hung from the ceiling on hay wire wrapped around small branches ; some were barrels cut in half, partially filled with peat moss and sawdust ; others were rotten logs hung vertically, and some horizontally. Soap boxes were also nailed to the wall, all the same ' pigeon style '. All of the entrances to the nests, and in fact a great many of the nests, were covered with Florida moss, hay, etc., in order to give the birds more seclusion. Ordinary chicken hoppers were used which had a connection from the outside to put in hemp, sunflower, millet, canary, and clover grass seed. The sawdust on the floor being damp, much of the wasted seed sprouted and was readily eaten by both the old and young.

In one end of the loft was a half-inch hardware square netting basket and under it a box of bran. Occasionally a calf's head was thrown in and while I never saw the parrots eat any of the fresh or decayed meat, nevertheless they relished the maggots which dropped from the basket.

This loft being in a dairy barn made it very convenient for the attendant occasionally to slip in by way of the trap door pans of sour milk or cottage cheese. I put in a chute, the entrance of which

was on the outside, which went down to the center of the room. Mixed feed was thrown daily down this chute. The reason for this was twofold.

First, because, so many birds, as you know, will not clear away the shells at the hoppers ; and second, to give the birds some exercise when hungry."

One can well imagine that this account was received with a deal of scepticism. Possibly the better to substantiate his claim, Lee commenced further breeding operations in Los Angeles, in 1930, but on more orthodox lines. The first young one was hatched in August, 1933, but lived only three weeks. In November, three were hatched and one was fully reared. This was to prove the forerunner of very many to be reared down the years.

Gilbert Lee died in 1941, but Mrs. Gilbert Lee continued to breed them and, I believe, still does. By now the fifth or sixth generation must have been reached.

* * *

Donations towards the cost of producing the MAGAZINE, or the Society's funds generally, will be gratefully accepted.

A. A. P.

* * *

LONDON ZOO NOTES

By J. J. YEALLAND

During the months of March and April a number of particularly interesting birds have been received. Those new to the Collection are a Rufous Fishing Owl (*Scotopelia ussheri*) presented by Mr. J. I. Menzies who collected it in Sierra Leone, two Inca Terns (*Larosterna inca*), and a Heine's Humming Bird (*Amazilia tzacatl jucunda*) received in exchange, and a Mrs. Wilson's Tanager (*Calospiza nigrocincta franciscae*) presented by Messrs. G. H. and J. R. Newmark.

The Fishing Owl is a great rarity, the few known specimens being found in Ghana, Sierra Leone, and in Liberia. The irides are described as being yellow, but those of our juvenile bird are of a dark umber brown.

The Inca Tern is a bird of the coastal areas of Peru and Chile. It is of a grey general colouring with a bright red bill and has on either side of the face curious, white curled moustache-like feathers.

Heine's Humming Bird is a race inhabiting western Ecuador and south-western Colombia. It is of a general iridescent green with a reddish-brown tail. Mrs. Wilson's Tanager is well known and has been depicted in the Magazine (1940, p. 243), though the colour of the neck is not accurately reproduced, being much too yellow.

Other presentations include a female Horned Screamer (*Anhima cornuta*) from Mr. Tom Spence, a Moorish Magpie (*Pica pica mauritanica*) collected in Morocco by Messrs. G. H. and J. R. Newmark and apparently the only specimen to be received since the arrival of the first in 1870. A Bengal Pitta and a pair of Madagascar Weavers were also donated by them, and a Greater Patagonian Conure by Mr. E. Ayling.

Two Violet Plantain-eaters and two Senegal Touracos (*Turacus persa buffoni*) have been purchased and a Hahn's Macaw received in exchange.

A female Kea which was, I believe, brought from New Zealand by the late Sydney Porter in 1938 and is the mother of the bird bred in his aviaries in 1946 (*Avicultural Magazine*, 1947, pp. 50–55), has been deposited by Mr. P. H. Maxwell. It was put with a male that was received here in 1952 and three eggs, which we think should be fertile, have been laid, but incubation (at least during the day) is being done entirely by the hen, not by both sexes as stated by Mr. Porter.

Three Spotted Eagle-Owls and two or three Great Eagle-Owls have been hatched and two Cormorants have left the nest. Two Spotted Eagle-Owls bred here last year and sent to Mr. C. af Enehjelm in Finland have, he tells me, produced young, breeding at about ten months of age, whereas, he says, the Great Eagle-Owl does not breed until the third year.

Abyssinian Eagle-Owls, Spectacled Owls, Great Grey Tinamous, and Gannets have eggs.

The interior of the Tropical House is being improved and flying space much enlarged by the removal of the corridor. Visitors will be able to walk through among the birds, entering by a darkened porch at one end and going out through a similar darkened porch at the other.

Humming Birds, Sugar Birds, small Tanagers, and perhaps Sunbirds will be kept there and it is hoped to publish photographs later.

* * *

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2 lb.	47/6	3½ lb.	72/6	6½ lb.	£6 12s. 6d.	All Carriage Paid.

MAGGOTS

We sell only the best liver-fed maggots, specially recleaned and ready for immediate use for bird feeding. Packed in bran. No mess or smell.

2 oz.	4 oz.	8 oz.	1 lb.	2 lb.	3 lb.
3/4	4/6	7/–	12/6	18/6	27/6

FEEDING SUNDRIES

	¼ lb.	1 lb.
Dried Flies (Chinese)	5/–	9/6
Silkworm pupae ((Whole)	3/9	6/6
" " (Ground)	4/–	6/9
Dried Mayfly larvae (Whole)	6/6	12/6
" " " (Ground)	6/9	12/9
Dried Dragonfly larvae	6/6	12/6
Dried Shrimp (Fine, Medium, or Coarse)	2/3	3/6
Ant Eggs	6/6	12/6
Pure Dried Egg	6/6	12/6
Dried Rowan Berries (Whole)	2/9	4/6
" " " (Crushed)	3/–	4/9

Pure Breadcrumbs (Fine, Medium, or Coarse), far superior to biscuit meal . . . 2 lb. 3/– ; 4 lb. 5/6 ; 14 lb. 17/6 ; 28 lb. 28/–

" Egg-crumbs," guaranteed to consist of 90 per cent breadcrumbs and 10 per cent pure egg . . . 2 lb. 5/6 ; 4 lb. 10/6 ; 7 lb. 17/6

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¼ lb.	1 10½	½ lb.	2 –	½ lb.	2 –	½ lb.	3 –	½ lb.	2 3
1 lb.	3 6	1 lb.	4 –	1 lb.	4 –	1 lb.	6 –	1 lb.	4 6
3½ lb.	11 9	3½ lb.	13 6	3½ lb.	13 6	3½ lb.	21 –	3½ lb.	15 –
7 lb.	22 9	7 lb.	26 6	7 lb.	26 6	7 lb.	38 8	7 lb.	29 9
28 lb.	85 –	28 lb.	98 –	28 lb.	98 –	28 lb.	154 –	28 lb.	112 –

C.L.O.
Rearing and Condition Food

½ lb.	1 –	14 lb.	20 –
1 lb.	2 –	28 lb.	38 6
3½ lb.	5 6	56 lb.	75 –
7 lb.	10 6	1 cwt.	140 –

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(Condition Seed)

3 oz.	1 –
1 lb.	4 6
3½ lb.	15 6
7 lb.	30 –

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A dehydrated form of green food consisting of lettuce, spinach, carrot, etc., readily taken by all birds. Packets 1 – & 3 6, also sold in bulk.

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(Original Boxes as imported)

2 lb.	47 6	3½ lb.	72 6	6½ lb.	£6 12s. 6d.	All Carriage Paid

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3 4	4 6	7 –	12 6	18 6	27 6

FEEDING SUNDRIES

	½ lb.	1 lb.
Dried Flies (Chinese)	5 –	9 6
Silkworm pupae (Whole)	3 9	6 6
" " (Ground)	4 –	6 9
Dried Mayfly larvae (Whole)	6 6	12 6
" " (Ground)	6 9	12 9
Dried Dragonfly larvae	6 6	12 6
Dried Shrimp (Fine, Medium, or Coarse)	2 3	3 6
Ant Eggs	6 6	12 6
Pure Dried Egg	6 6	12 6
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" " (Crushed)	3 –	4 9

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JAMES K. GUTHRIE, to 3275 Valencia Avenue, San Bernardino, Calif., U.S.A.

E. J. T. HOUSDEN, to c/o The District Commissioner, P.O. Mkushi, Northern Rhodesia.

Dr. GORDON FORSTER JOLLY, to The Bungalow, Southmead Hospital, Bristol.

PETER H. JOHNSON, to Heathercliffe Lodge, Penistone, Nr. Sheffield.

M. KENDALL, to 9 Ray Lodge Mews, Ray Park Avenue, Maidenhead, Berks.

M. C. LANCASTER, to Pheasant Walk, Cobb Hall, Sharnbrook, Beds.

K. J. LAWRENCE, to 3 The Milestones, Hatfield Peverel, Essex.

Mrs. A. R. LONGHURST, to c/o British Museum (Natural History), Cromwell Road, London, S.W.7.

C. OLIVER, to c/o Paignton Zoological and Botanical Gardens, Paignton, Devon.

DERRICK PARKEN, to P.O. Box 1058, Englewood, Florida, U.S.A.

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G. STUCKEY, to 69 Mimms Hall Road, Potters Bar, Middx.

W. H. TIMMIS, to Jersey Zoological Park, Les Augres Manor, Trinity, Jersey, C.I.

A. W. TUNESI, to 10 Burgoyne Road, Sunbury-on-Thames, Middx.

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